IIHMR DELHI | INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH

Post Graduate Diploma in Management (Hospital & Health Management)
PGDM – 2021-23 Batch
Term – III: Term End Examination

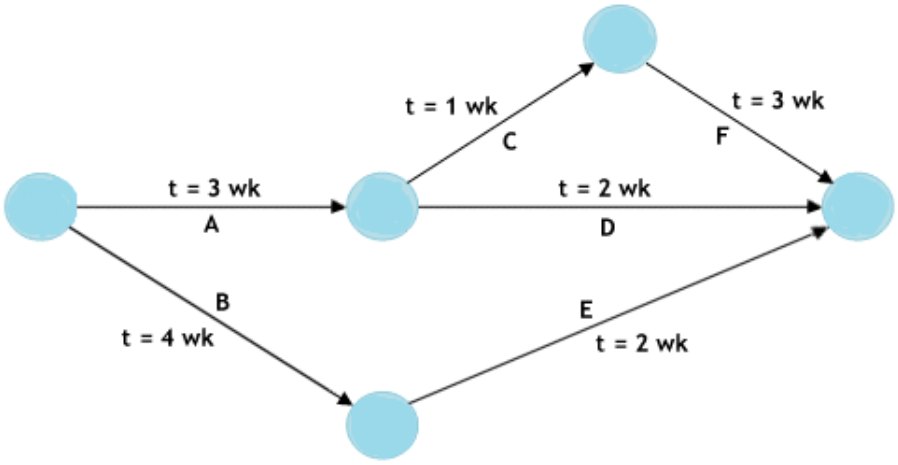
Course & Code	:	**Operations Management in Hospitals HOM 716**	**Reg. No.**	:	
Term & Batch	:	**III, 2021-23**	**Date**	:	
Duration	:	**3 Hrs.**	**Max. Marks**	:	**70**

Instructions:

- Budget your time as per the marks given for each question and write your answer accordingly.
- Don't write anything on the Question Paper except writing your Registration No.
- Mobile Phones are not allowed even for computations.

Part A: Q. 1 to Q.10 (10 questions*1 marks = 10 marks).

Q.1 The project duration (length of critical path) in the network diagram below is:

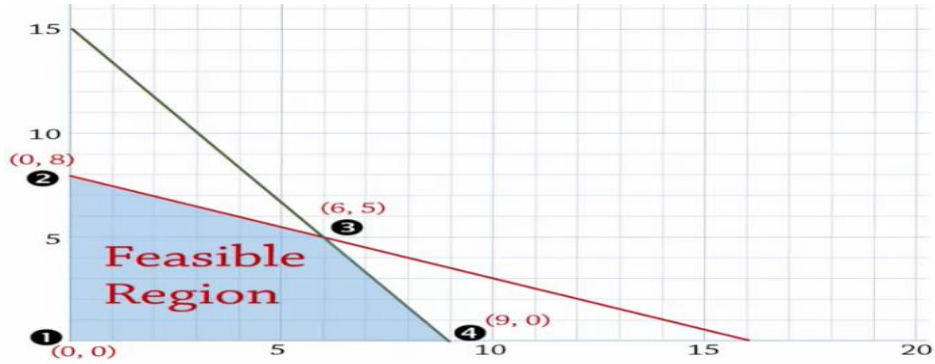


a) 5 wks
b) 6 wks
c) 9 wks
d) 7 wks

Q.2 In PERT analysis, if the three time estimates for an activity are 2, 3 and 10, the expected time is:

a) 3
b) 4
c) 5
d) 6

Q.3Feasible region (shaded) for a LPP is shown in figure below:



The objective function is Maximize Z= 2 x1 + 5 x2, The point at which the objective function is maximized is :

a) (0, 8)
b) (6,5)
c) (9,0)
d) (0,0)

Q.4Patients arrive at a hospital Outpatient Pharmacy at a rate of 15 per hour. The inter-arrival time is

a) 4 min
b) 5 min
c) 6 min
d) 10 min

Q.5 One physician on duty full time works in a hospital emergency room. Previous experience has shown that emergency patients arrive according to a Poisson distribution with an average rate of four per hour. The physician can provide emergency treatment for approximately six patients per hour. The system utilization is:

a) 0.5
b) 0.66
c) 0.8
d) 0.9

Q.6 When it is not possible to find solution in LPP, it is called as case of.

a) Unknown solution
b) Unbounded solution
c) Infeasible solution
d) Improper solution

Q.7The method used for solving an assignment problem is called

a) NWCR
b) VAM
c) Hungarian
d) LCM

Q.8_____ or _____ are used to "balance" an assignment or transportation problem.

a) Destinations; sources
b) Units supplied; units demanded
c) Dummy rows; dummy columns
d) Large cost coefficients; small cost coefficients

Q.9 An assignment problem can be viewed as a special case of transportation problem in which the capacity from each source is _____ and the demand at each destination is _____.

a) 1; 1
b) Infinity; infinity
c) 0; 0
d) 1000; 1000

Q.10 The solution to a transportation problem with 'm' rows (supplies) & 'n' columns (destination) is feasible if number of positive allocations are

a) m + n
b) m * n
c) m + n – 1
d) m + n + 1

Part B: Q.11 to Q.16 (5 questions *12 Marks =60 Marks) **Attempt any <u>five</u>.**

Q.11 What is operations management? How you can apply in healthcare services production. Explain the various operations management tools and techniques that could be applied in hospitals.

Q.12 A Medical Supply company produces catheters in packs at three productions facilities. The company ships the packs from the production facilities to four warehouses. The packs are distributed directly to hospitals from the warehouses. The table shows the costs per pack to ship to the four warehouses.

Medical Supply

	TO WAREHOUSE			
FROM PLANT	**Seattle**	**New York**	**Phoenix**	**Miami**
Juarez	$19	$7	$3	$21
Seoul	$15	$21	$18	$6
Tel Aviv	$11	$14	$15	$22

<u>Capacity</u>		**<u>Demand</u>**	
Juarez	100	Seattle	150
Seoul	300	New York	100
Tel Aviv	200	Phoenix	200
		Miami	150

Find the solution for the given problem by VAM method, if the object is to minimize total transportation cost.

Q.13 Consider a hospital that is open seven days a week. Based on past experience, the number of nurses needed on a particular day is given as follows.

	x_2	x_3	x_4	x_5	x_6	x_7	x_1
Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
No. of Nurses	200	150	250	90	160	300	100

Every nurse works five consecutive days, and then takes two days off, repeating this pattern indefinitely. How can we minimize the number of nurses that staff the hospital?

Q.14 A hospital is considering a project of launching a new radiation oncology service. The list of necessary activities and their duration, is shown in table below:

Activity Name	Description	Time Weeks)	Predecessor
A	Land acquisition	4	-
B	Hire radiation oncologist	16	-
C	Select contractor & plan	8	A,B
D	Build facility	24	C
E	Acquire equipment	28	C
F	Hire technical staff	4	D,E
G	Setup software	8	D,E
H	Test equipment	4	F,G

Draw the network for the project, determine the critical path and compute the minimum time for launching the new radiation oncology service. Calculate ES, LS, EF, LF, and float for each activity.

Q.15 The counter of a bank branch performs the transactions with a mean time of 2 minutes. The customers arrive at a mean rate of 20 customers/hour. If we assume that arrivals follow a Poisson process and that the service time is exponential, Determine:

a) Percentage of the time the bank teller is idle
b) Mean waiting time of the customers
c) Percentage of customers that wait in a queue

Q.16 Solve the following assignment problem. All four tasks must be completed.

		Men		
		1	2	3
Task	*P*	9	26	15
	Q	13	27	6
	R	35	20	15
	S	18	30	20

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